

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Divisional Application
Under 27 CFR 160
Pending Application of

Morris F. Dilmore et al
Serial No. 09/592,974
Filed: June 12, 2000

METAL CONSOLIDATION PROCESS
APPLICABLE TO FUNCTIONALLY
GRADIENT MATERIAL (FGM)
COMPOSITIONS OF TANTALUM AND
OTHER MATERIALS

Art Unit 1775

Pasadena, California
November 2, 2001

AMENDMENT ACCOMPANYING REQUEST FOR
FILING DIVISIONAL APPLICATION
UNDER 37 CFR 1.60 FILED HEREWITH

Assistant Commissioner for Patents

Washington, D.C. 20231

Sir:

Please amend the divisional application as
established under 37 CFR 1.60 as follows:

In the Claims:

Please file the following claims 32-39 and
41-47. Only those claims 32-39 and 41-47 are to be
filed.

32. A metallic body which has been compressed and consolidated from an initial powder metal form to a highly densified form, the body consisting of at least two metals, the proportions of which vary along a body dimension, one of said metals being tantalum.

33. The body of claim 32 wherein the body consists of at least four metals.

34. The body of claim 33 wherein said metals are selected from the group that includes tungsten, rhenium, uranium, tantalum, platinum, copper, gold, hafnium, molybdenum, titanium, zirconium and aluminum.

35. The body of claim 32 wherein the body is elongated and has a tapered nose portion, there being a second body portion along said dimension, the body consisting of at least two metals, M_1 and M_2 , the proportions of M_1 and M_2 in said body nose portion and second body portion being different.

36. The body of claim 35 wherein the metal M_1 is tantalum, the proportion of tantalum in said nose portion being greater than the proportion of tantalum in said second body portion.

37. The body of claim 36 wherein the body has third and fourth body portions along said dimension, the proportion of tantalum in said second body portion exceeding the proportion of tantalum in said third body portion, and the proportion of tantalum in said third body portion exceeding the proportion of tantalum in said fourth body portion.

38. The body of claim 32 wherein the body has first and second ends, the consolidated metal at the first end having higher density than the metal at the second end.

39. The body of claim 38 wherein the metal at the first end consists primarily of tantalum, and the metal at the second end consists primarily of M_1 , M_2 , or M_x .

41. The body of claim 32 which has decreasing strength or ductility in each of two body dimensions.

42. The body of claim 41 wherein said two dimensions are length and thickness.

43. The body of claim 41 wherein said two dimensions are longitudinal and lateral.

44. The body of claim 41 wherein said body tapers toward a top zone, the body ductility and/or strength being greatest at said top zone.


45. The body of claim 41 wherein said body comprises a conical shell.

46. The body of claim 41 which has a cylindrical section and a tapered section at one end of the cylindrical section.

47. The method of claim 32 wherein the consolidated tantalum has <111> texture of less than about 2.8X random.

Allowance is urged.

Respectfully submitted,


William W. Haefliger
Attorney for Applicant
Registration No. 17,120
(323) 684-2707

WWH:ts
Docket 12,105-1

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